

ABSTRACT

Systems and methods that facilitate automatic convergence and geometry alignment in projection systems such as a PTV. The automatic convergence system (ACS) preferably includes a CCD camera mounted inside the PTV and focused on the entire inside of a projection screen Fresnel lens. Alternatively, the ACS may include a deployable reflective sheet, preferably in the form of a roll up screen. In operation, signals from the CCD camera corresponding to test patterns projected onto the Fresnel lens or reflective sheet are analyzed and used to align, center or steer raster patterns to compensate for convergence error at a particular location. In a convergence mode, the video is blanked and then successive monochrome video test patterns are projected on the screen. The images captured by the CCD camera are used to memorize the location of landing points of one color test pattern from one of the projection units and then to align the other color patterns from the other projection units to the same landing points as the first color pattern. In a geometry alignment mode, the difference in brightness between an image striking the Fresnel screen and the over scanned area of the PTV cabinet is used to determine the border of the screen. This information is then used to provide reference marks for all geometrical adjustments done automatically using a similar process of successive test patterns and analysis.